Bureau of Land and Water Quality Management
Division of Watershed Management
Industrial Stormwater Program

Standard Operating Procedure for Effluent Monitoring of Stormwater Discharges for Facilities Covered Under the MPDES Multi-Sector General Permit for Stormwater Discharges Associated Industrial Activities.

1. **APPLICABILITY.** This Standard Operating Procedure (SOP) applies to specific industrial facilities covered under Maine's Multi-Sector General Permit (MSGP) for Stormwater Discharge Associated with Industrial Activity. Industrial facilities classified under sector codes A, C, D, E, J, K, L, & S may be subject to analytical effluent compliance monitoring provided that effluent from their industrial activity meet effluent guidelines established in the federal clean water act and that the discharge is not already subject to an existing individual MPDES discharge permit. Additionally, any facility which has a discharge of stormwater from coal storage piles must comply with the limitations and monitoring requirements for coal pile runoff set forth in Part V of the Maine MSGP for Stormwater Discharge Associated with Industrial Activity. (Also see Table 1)

2. **PURPOSE.** To establish standardized methods for sample collection and analytical monitoring of industrial stormwater discharges for indicators of stormwater pollution as defined in Parts V and VI of the Maine MSGP. To establish standardized methods of data recording and record keeping of all analytical effluent monitoring data.

3. **DEFINITIONS.**

   3.1. DMR. DISCHARGE MONITORING REPORT. Reports results of analytical effluent monitoring in accordance with procedures set forth in Part VII of the Maine MSGP. Shall be submitted to the department following each monitoring period.

   3.2. GRAB SAMPLE. Sample of stormwater discharge taken as a single uninterrupted event (i.e. grabbed at one time) from a single stormwater outfall from the industrial facility. May be collected manually or with an automatic sampler.

3.3. HOLD TIME. The maximum amount of time after collection that a stormwater sample is considered to be stable and suitable for analysis for pollutants. Hold times are specified in the EPA test methods listed in 40 CFR Part 136 and vary greatly depending on the pollutant parameters to be analyzed.

3.4. MEASURABLE STORM EVENT. Any storm event that yields at least 0.1 inch of precipitation.

3.5. MULTI-SECTOR GENERAL PERMIT ("MSGP"). A five year general permit for stormwater discharge associated with industrial activity. The permit authorizes the direct discharge of stormwater associated with industrial activity to waters of the State other than groundwater, provided the discharge meets the requirements stated within the permit. This permit is effective from October 11, 2005, and expires October 11, 2010, and replaces EPA's MSGP for Industrial Activity issued October 30, 2000. The Department will re-issue the MSGP in October 2010.

3.6. OUTFALL. Any location such as a ditch, rill, pipe, storm drain, or retention pond exit where shallow concentrated flow of stormwater leaves and industrial facility.

3.7. STORMWATER POLLUTION PREVENTION PLAN ("SWPPP"). A written plan developed and implemented by each industrial facility to reduce or eliminate pollutants that come in contact with stormwater. This plan outlines sources of potential stormwater pollutants and the methods by which these pollutants will be prevented from entering waters of the State.

4. RESPONSIBILITIES.

4.1. MONITORING PROGRAM IMPLEMENTATION. The schedule for performing analytical effluent monitoring must be clearly documented in the facility's SWPPP. The permittee must perform and document analytical effluent monitoring of industrial stormwater discharges from each outfall which discharges stormwater associated with industrial activities subject to analytical effluent monitoring.

4.2. OUTFALL IDENTIFICATION. The permittee must identify each industrial stormwater outfall subject to effluent monitoring at the facility. All outfalls shall be clearly identified by an outfall number on the facility site map which is part of the facility's SWPPP and also listed by outfall number in the written text of the SWPPP.

4.3. EMPLOYEE TRAINING. The permittee shall be responsible for ensuring that all facility personnel involved in stormwater sampling are properly trained to do so. Staff involved in sampling shall be familiar with the site map and outfall locations, walk the site to physically identify each sampling location, become familiarized with local rainfall and drainage patterns, learn proper procedures for measuring rainfall, and become familiar with proper sample collection procedures. Personnel involved in sampling should also be trained in all facility safety procedures as they apply to stormwater sampling. Where practicable the same individual should carry out the collection of discharge samples for the entire permit term. Written documentation certifying that all personnel involved in sampling have been properly trained shall be maintained onsite with the SWPPP.

4.4. SAMPLE COLLECTION FREQUENCY FOR ALL SECTORS. Collection of industrial stormwater discharge samples from activities subject to effluent monitoring **must be performed at least once per year**. The monitoring year is from October, 1 to September, 30. All other time specific sampling requirements are to be performed in accordance with the parameters outlined in section 5.2 of this document.

4.5. SAMPLE COLLECTION FREQUENCY FOR SECTORS WITH MONTHLY AVERAGE REQUIREMENTS. Some industrial sectors are subject to monthly average effluent limitations in addition to daily maximum effluent limits. A single sample taken once per year is acceptable for demonstrating compliance with the monthly average effluent limits so long as the limited pollutants are not present in concentrations greater than the permitted limits for monthly average. Additional samples may be taken to attempt to lower the monthly average during qualifying rain events as defined in section 5.2 if the pollutant concentrations in the single sample exceed the monthly average effluent limitations.

4.6. RECORD KEEPING AND REPORTING. The permittee shall maintain records of all analytical effluent monitoring information in accordance with the requirements set forth in Part VII of Maine's MSGP for Stormwater Discharge Associated with Industrial Activity. Additionally, copies of sample chains of custody, and copies of discharge monitoring reports will be maintained on site with the SWPPP.

5. PROCEDURES

5.1. MEASURING RAINFALL. All facilities required to perform effluent monitoring of industrial stormwater discharges shall have a rain gauge on site for measuring rainfall. The rain gauge may be a standard rain gauge, tipping bucket gauge, weighing type gauge, float recording gauge, or any other National Weather Service approved device for measuring rainfall to the nearest 0.1 inch. To minimize measurement errors, the gauge should be placed on a level surface that is not windswept and is away from trees or buildings that might interfere with the path of rainfall. The gauge should be regularly inspected by sampling personnel to ensure that it is in good working order and capable of accurately measuring rainfall to the nearest 0.1 inch.

5.2. SAMPLE COLLECTION TIMING. A grab sample must be collected from each facility outfall subject to effluent monitoring during a measurable storm event that occurs at least 72 hours from the previously measurable storm event. The 72 hour interval is waived when the preceding measurable storm did not yield a measurable discharge, or if the permittee is able to document that less than a 72 hour interval is representative for local storm events during the sampling period. Take the grab sample during the first **sixty (60) minutes** of the discharge whenever this is practicable. Samples shall not be collected later than 2.25 hours after the start of a measurable storm event. Ideally samples should be collected during the first thirty (30) minutes of discharge. If it is not practicable to take the sample during the first 30 minutes, sample during the first hour of discharge and describe why a grab sample during the first 30 minutes was impracticable. Submit this information on or with the discharge monitoring report.

5.3. SAMPLE CONTAINER CLEANING AND PREPARATION. The facility shall have an adequate supply of containers prepared for collection of industrial stormwater samples from each outfall prior to collecting samples for analytical effluent monitoring. Sample containers shall be cleaned and prepared for sample collection according to the US EPA test methods listed in 40 CFR Part 136. The container type as well as cleaning and preparation procedures vary greatly depending on the analysts of interest. For this reason it is highly recommended that sampling containers for the required analyses be obtained from a nationally accredited environmental testing laboratory which is certified in performing these analyses. Most laboratories can provide clean sample containers, preservatives, sealing, and can provide further advice on sample preservation and handling.

5.4. SAMPLE COLLECTION. Samples for analytical effluent monitoring shall be collected and preserved in containers specified in the appropriate EPA test method(s) for the analysts of interest. Minimum sample volumes, preservation techniques, and hold times vary depending on the pollutant parameter to be measured; therefore familiarity with 40 CFR Part 136 is essential to ensure correct collection, preservation, and timely analysis. It is also important to verify that the preservation techniques for one parameter do not affect the analytical results of another in the same sample. If this is the case, a sufficient number of samples for all required analyses should be collected from the same outfall and preserved accordingly. Additionally, the required number of distilled/deionized water blanks shall be collected if required by the appropriate EPA test method(s) used to measure the required pollutant parameters.

5.4.1. REPRESENTATIVE OUTFALLS-ESSENTIAL IDENTICAL DISCHARGES. If the facility has two (2) or more outfalls that the permittee believes discharge substantially identical effluents, based on similarities of the industrial activities, significant materials or stormwater management practices occurring within the outfalls' drainage areas, the permittee may test the effluent of just one of the outfalls during a sampling period, provided that subsequent samples are taken from a different substantially identical outfall(s) during each successive monitoring period, and report that the quantitative data also applies to the substan-

tially identical outfall. For this to be permissible the permittee must follow the instructions for sampling from representative outfalls set forth in Part V of the Maine MSGP.

5.4.2. MANUAL GRAB SAMPLE COLLECTION. Manual grab samples are to be collected by inserting a container under or downstream of a discharge with the container opening facing upstream. In most cases the sample container can be held in hand while the sample is collected. Less accessible outfalls may require the use of poles and buckets to collect grab samples. Take the grab from the horizontal and vertical center of the outfall. If sampling in a channel, (i.e., ditch, trench, rill) avoid stirring up bottom sediments. Avoid touching the inside of the container to prevent contamination. Transfer sample to the appropriate container if using another container such as a bucket to collect a sample from a less accessible location. If taking samples from multiple outfalls, label containers with outfall identification prior to taking samples.

5.4.3. COLLECTION OF GRAB SAMPLES BY AUTOMATIC SAMPLER. Facilities which use automatic samplers for stormwater sampling may collect grab samples for visual examination by this method. Programming for collecting grab samples is specific to the type of automatic sampler. All facility personnel which collect stormwater samples using automatic samplers must be properly trained in operation of the sampler before doing so. Several different types of automatic samplers are available for stormwater sampling. However, the following guidelines should be followed when sampling regardless of the type of sampler used. All equipment must be properly cleaned, particularly the tubing and sample containers. Deionized water should be drawn through the sampler to remove any residuals prior to taking samples. Tubing should also be periodically replaced to avoid algae or bacterial growth. Additionally, the permittee shall verify that the use of an automatic sampler is an appropriate method of sample collection for the EPA test method(s) to be used for sample analysis. If so, the sampler shall be cleaned and prepared in accordance with the appropriate EPA test method(s) listed in 40 CFR Part 136 prior to collecting samples. Samplers shall be used in exact accordance with the manufacturers' instructions. All sampler calibration and maintenance data shall be kept on site with the SWPPP.

5.5. SAMPLE IDENTIFICATION AND LABELING. Prior to shipping samples for analysis, a waterproof, gummed sample identification label or tag should be attached to the sample container. This label should contain the following information.

- Facility name
- Name of the sample collector
- Sample identification number
- Date and time of sample collection
- Type of analysis required

- Location of sample collection
- Preservatives used
- Type of sample (grab or composite)

5.6. CHAIN OF CUSTODY PROCEDURES. Once samples have been collected, the permittee or designated responsible party shall create a chain of custody. A chain of custody is a documented account of changes in possession that occur for samples from their origin through analysis. The chain of custody should document the following information for all samples collected.

- Sample identification number(s)
- Date and time of sample collection
- Source of sample and location of sample collection
- Name of sampling personnel
- Sample type (composite or grab)
- Preservation used
- Analysis required
- Name and signatures of all persons handling the samples in the field and laboratory.

Chain of custody forms should be printed on carbonless, multipart paper so all personnel handling the sample receive a copy. The chain of custody shall be included with the samples during shipment to the laboratory. When transferring possession of samples, the transferee should sign and record the date and time on the chain of custody. Each person who takes custody of the samples should fill in the appropriate section of the chain of custody record.

5.7. SAMPLE PACKING AND SHIPPING. All stormwater samples collected must be analyzed for the required pollutant parameters within the hold times for these parameters specified in the test methods listed in 40 CFR Part 136. Therefore, timely shipping of samples for analysis is essential. If samples are not hand delivered to the laboratory or analyzed in an onsite laboratory, they should be placed in a transportation case (e.g., cooler) for shipment. Glass bottles should be wrapped in padding to prevent breakage. All sample container lids should be sealed with tape to prevent leakage. Samples should be placed in ice or a synthetic ice substitute (if specified by appropriate EPA test method for pollutant parameters to be measured) to maintain the samples at 4^0C throughout shipment. Ice should be placed in double wrapped watertight bags so the water will not leak from the shipping case. The chain of custody should be placed in a waterproof envelope or other waterproof container and taped to the inside of the transportation case to avoid getting them wet in the event of leakages. Shipping containers should also be sealed to prevent opening during shipping. If samples are shipped through common carrier or sent

through U.S. Mail, they must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Parts 171-177). Before shipping samples, the facility should be aware of, and follow any special shipping requirements. Stormwater samples are not generally considered hazardous materials, but depending on the conditions at the collection site there may be hazardous materials present in the samples.

5.8. SAMPLE ANALYSIS. Samples shall be analyzed for the required pollutant parameters according to the procedures set forth in the appropriate EPA test method(s) listed in 40 CFR Part 136. Due to the complex nature of analysis and cost of the necessary equipment, it is recommended that samples be analyzed by a nationally accredited environmental testing laboratory.

5.9. SAMPLE DATA RECORDING AND REPORTING. The permittee shall record and report all effluent monitoring data in a discharge monitoring report (DMR) each time effluent monitoring is conducted (see attachment A). The DMR shall include the following information:

- The legal facility name, facility mailing and physical address, and Maine MSGP permit number, facility sector and SIC codes
- The dates of the effluent monitoring year
- The date, outfall(s) number(s), and time of sample collection
- Type of sample(s) collected from outfall(s) i.e., grab or composite
- The name and signature of the sample collector
- Names and numeric limits of effluent pollutant parameters analyzed
- Analysis results for all required pollutant parameters
- EPA test methods used for sample analysis
- Name of laboratory analyst(s) who performed the analyses
- Date of laboratory analysis
- Any violations of numeric effluent limitations, explanation of the violation, and description of remedial actions taken
- Name, title, and signature of the facility's Principle Executive Officer, or Designated Responsible Party, telephone number, and date of signing.

In addition to the preceding information, it is recommended that the DMR include comments about any observed abnormalities observed in outfall(s) sampled so as to provide information about any unusual analysis results. All DMRs shall be submitted to the DEP by the 15th day of the month following the monitoring period. If a sample taken during the monitoring year has a result which violates the numeric limits established for that sector, the result must be reported to the DEP with in 48 hours of receipt of analysis results. A written report de-

tailing the cause and corrective action plan must be submitted within 5 business days. Copies of all DMRs, Corrective Action Reports, laboratory sample analysis reports, and sample chains of custody shall be maintained on site with the SWPPP.

5.10. SOLUTIONS TO SAMPLE LOCATION PROBLEMS. Consult guidelines listed below when it is necessary to sample an outfall located at a less than ideal location for sampling.

- PROBLEM: Sampling where stormwater commingles with process or non process water.
  SOLUTION: Attempt to sample the stormwater discharge before it mixes with the non-stormwater discharge. If this is impossible, sample the discharge both during dry and wet weather and maintain a record of the visual examination data observed under both conditions on site with the SWPPP. This will provide an indication of the contribution of any observable contamination from each source.

- PROBLEM: Numerous small point channels make up an outfall from which it is difficult to collect a sample.
  SOLUTION: Impound channels or join their flow together by building a weir or digging a ditch to collect discharge at a low point for sampling. This artificial collection point should be lined with plastic to prevent infiltration and/or high levels of sediment.

- PROBLEM: Inaccessible discharge point (examples include underwater discharges or unreachable discharges (e.g., out of a cliff).
  SOLUTION: Go up the pipe to sample (i.e., to the nearest manhole or inspection point). If these are not available, tap into the pipe, or sample at several locations upstream of the pipe if the pipe is the only outfall for the facility.

- PROBLEM: Managing multiple sampling sites to collect grab samples during the first 60 minutes of a measurable storm event.
  SOLUTION: Have a sampling crew ready for mobilization when forecasts indicate a measurable storm event is likely to occur. If this is not possible, sample other outfall locations during other measurable storm events.

- PROBLEM: Commingling of parking lot runoff with discharge associated with industrial activity.
  SOLUTION: The combined runoff must be sampled at the discharge point as near as possible to the receiving water or at the parking lot drain inlet if there is one.

- PROBLEM: Sampling in manholes
  SOLUTION: Sample with a collection device on the end of a pole to reach stormwater. Personnel sampling in manholes must have confined space safety training if manhole has to be entered.

- PROBLEM: Run-on from other property.

SOLUTION: If possible, collect and examine a sample of the stormwater at the border of the property where the run on occurs. Then, collect and examine a sample of the stormwater at a facility outfall downstream of the run-on point. Note any observable differences between the samples and maintain the documentation with the SWPPP.

- When confronted with other difficult sampling scenarios not addressed above, the permittee should consult DEP for guidance on how to best address the situation.

6. REFERENCES

6.1. STATE OF MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION MULTI-SECTOR GENERAL PERMIT MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM STORMWATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY Maine Department of Environmental Protection, Bureau of Land and Water Quality, Waste Discharge License # W-008227-5Y-A-N (October 11, 2005)

6.2. GUIDANCE MANUAL FOR THE MONITORING AND REPORTING REQUIREMENTS OF THE NPDES MULTI-SECTOR STORM WATER GENERAL PERMIT
United States Environmental Protection Agency, Office of Water (EN-336), EPA 833-B-99-001(January, 1999)

6.3. NPDES STORM WATER SAMPLING GUIDANCE DOCUMENT
United States Environmental Protection Agency, Office of Water (EN-336), EPA 833-8-92-001 (July, 1992)

Table 1: Required Parameters and Numeric Limitations for Facilities Subject to Effluent Monitoring under the Maine MSGP for Stormwater Discharges Associated with industrial Activities.

MSGP Sector	SIC/Activity Code(s)	Affected Activities	Required Parameters	Numeric Limitation
A	2411	Log Storage and Handling Wet Decking Discharges	pH	6.0-9.0 s.u.
			Debris (Woody material such as bark, twigs, branches, heartwood or sapwood)	No discharge of debris that will not pass through a 2.54 cm diameter round opening
C	2874	Contaminated runoff from Phosphate Fertilizer Manufacturing Facilities	Total Phosphorus (as P)	105 mg/L, daily max 35.0 mg/L 30 day avg.
D	2951-2952	Runoff from Asphalt emulsion facilities	Total Suspended Solids	23 mg/L, daily max 15 mg/L, 30 day avg.
			Oil and Grease	15 mg/L, daily max 10 mg/L, 30 day avg
			pH	6.0-9.0
E**	3272*	Cement Mfg. Material Storage Runoff	pH	6.0-9.0
J	1422-1429 1442, 1446	Mine Dewatering at Construction Sand and Gravel;Industrial Sand and Crushed Stone Mining Facilities	Total Suspended Solids	45 mg/L, daily max 25 mg/L monthly avg.
			pH	6.0-9.0
K, L	LF, HZ	Landfills and Land Application Sites	BOD5	140 mg/L daily max 37 mg/L monthly avg max
			Total Suspended Solids	88 mg/L daily max 27 mg/L monthly avg max

Table 1 Continued

MSGP Sector	SIC/Activity Code(s)	Affected Activities	Required Parameters	Numeric Limitation
K, L	LF, HZ	Landfills and Land Application Sites	Ammonia	10 mg/L daily max 4.9 mg/L monthly avg max
			Alpha Terpineol	0.033 mg/L daily max 0.016 mg/L monthly avg max
			p-Cresol	0.025 mg/L daily max 0.014 monthly avg max
			Phenol	0.026 mg/L daily max 0.015 mg/L monthly avg max
			Zinc (total)	0.20 mg/L daily max 0.11 mg/L monthly avg max
			pH	6.0-9.0
O	4911	Coal Pile Runoff from Steam Electric Generating Facilities	pH	6.0-9.0
			Total Suspended Solids	50 mg/L daily max
ALL	ALL	Coal Pile Runoff	Total Suspended Solids	50 mg/L daily max